

***Children's Safe Product Act – Reporting Rule – WAC 173-334
Reporting Guidance – Practical Quantification Limits (PQLs)***

CSPA CHCC PQL Summary:

January 31st, 2012

Background:

Analysis of products for specific chemicals of high concern to children (CHCC) is a complicated and difficult process. The information provided below was obtained from several sources and provides projected practical quantification limits (PQLs) for products or similar waste materials. For the analysis provided below, a hierarchy was established to determine the most appropriate PQL. Data sources were ranked as follows:

1. Actual data reports from Ecology or contract laboratories that analyzed products, similar materials or complex mixtures in waste materials for specific CHCCs.
2. Information from laboratories that offer the ability to analyze products, similar materials or complex mixtures in waste materials for specific CHCCs.
3. Data from authoritative sources that analyzed products, similar materials or complex mixtures in waste materials for specific CHCCs.

No information was used from vendors or other sources of information if product, similar materials or complex mixtures in waste materials were not sampled and relevant PQL information provided.

The following table lists the individual CHCCs and projected PQLs. As PQLs are dependent upon a wide range of factors including type of media, companion and co-eluting chemicals, etc., the PQLs provided here should be taken as initial estimates. In addition, safety factors are included in the projected PQLs to compensate for potential sample variability and complexity. For example, the following table indicates a PQL of 10 ppm for decabromodiphenyl ether. Ecology has tested several children's products for decabromodiphenyl ether and was able to attain a PQL of less than 1 ppm. The value of 10 ppm is used here however to provide a safety factor for more complex or difficult as matrices. As Ecology begins to test additional children's products for specific CHCCs, results from these analyses will be used to update the projected PQL table.

The table also includes a column that indicates the methodology reported by one of the sources above. Priority was given to methods developed by EPA to implement RCRA as RCRA covers a wide range of media types including water, soil, sediment and waste and RCRA methods are often adapted for other applications such as product testing. Therefore although the column indicates which EPA method was used, actual analysis may entail an adaptation of the original method and may be specific to the laboratory doing the analyses. In addition, although these methods are reported in the sources Ecology used, they are not the only methods that can be used to test products. Ecology recommends the manufacturer analyze their products using a method approved by an authoritative agency such as EPA that produces the lowest possible PQL.

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The following is the summary of projected PQLs for the 66 chemicals of high concern to children.

	Chemical	CAS	PQL (ppm)	Method
1	Formaldehyde	50-00-0	5.0	8315
2	Aniline	62-53-3	1.0	8270
3	N-Nitrosodimethylamine	62-75-9	1.0	8270
4	n-Butanol	71-36-3	5.0	8015
5	Benzene	71-43-2	1.0	8260
6	Vinyl chloride	75-01-4	1.0	8260
7	Acetaldehyde	75-07-0	1.0	8315
8	Methylene chloride	75-09-2	1.0	8260
9	Carbon disulfide	75-15-0	10.0	8260
10	Methyl ethyl ketone	78-93-3	1.0	8260
11	1,1,2,2-Tetrachloroethane	79-34-5	1.0	8260
12	Tetrabromobisphenol A	79-94-7	20.0	3540/GCMS
13	Bisphenol A	80-05-7	20.0	8270
14	Diethyl phthalate	84-66-2	5.0	8270
15	DBP (Dibutyl phthalates); di-n-butyl phthalate	84-74-2	5.0	8270
16	Di-n-Hexyl Phthalate	84-75-3	5.0	8270
17	Phthalic anhydride	85-44-9	100.0	8091
18	Benzyl butyl phthalate; Butyl benzyl phthalate	85-68-7	5.0	8270
19	N-Nitrosodiphenylamine	86-30-6	1.0	8270
20	Hexachlorobutadiene	87-68-3	30.0	8270
21	Propyl paraben	94-13-3	30.0	HPLC
22	Butyl paraben	94-26-8	30.0	HPLC
23	2-Aminotoluene	95-53-4	1.0	8270
24	2,4-Diaminotoluene	95-80-7	10.0	GC/MS
25	Methyl paraben	99-76-3	30.0	HPLC
26	p-Hydroxybenzoic acid	99-96-7	10.0	HPLC
27	Ethylbenzene	100-41-4	1.0	8260
28	Styrene	100-42-5	1.0	8260
29	4-Nonylphenol; 4-NP and its isomer	104-40-5	10.0	USGS 5-B2
30	para-Chloroaniline	106-47-8	60.0	8270
31	Acrylonitrile	107-13-1	1.0	8260
32	Ethylene glycol	107-21-1	5.0	8015
33	Toluene	108-88-3	1.0	8260
34	Phenol	108-95-2	60.0	8270
35	2-Methoxyethanol	109-86-4	10.0	8015
36	Ethylene glycol monoethyl ester	110-80-5	10.0	8015
37	Tris(2-chloroethyl) phosphate	115-96-8	50.0	Not given ¹
38	DEHP; bis(2-ethylhexyl) phthalate	117-81-7	20.0	8270

¹ Not given means that the source provided details on the PQL but no information on the method used. Many laboratories contacted for information reserved information on methods as confidential business information.

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	Chemical	CAS	PQL (ppm)	Method
39	DOP (Di-n-octyl phthalate)	117-84-0	5.0	8270
40	Hexachlorobenzene	118-74-1	30.0	8270
41	3,3'-Dimethylbenzidine & Dyes Metabolized to same	119-93-7	10.0	8270
42	Ethyl paraben	120-47-8	30.0	HPLC
43	1,4-Dioxane	123-91-1	1.0	8270/many
44	Perchloroethylene; tetrachloroethylene	127-18-4	0.5	8260/many
45	Benzophenone-2	131-55-5	20	GC-FID
46	4-tert-Octylphenol	140-66-9	10.0	USGS 5-B2
47	Estragole	140-67-0	10.0	IFRA GCMS
48	2-Ethylhexanoic Acid	149-57-5	1.0	Not given
49	Octamethylcyclotetrasiloxane	556-67-2	10.0	8260/8015
50	Pentachlorobenzene	608-93-5	1.0	8270
51	C.I. Solvent Yellow 14	842-07-9	1.0	LC/MS ²
52	N-Methylpyrrolidone	872-50-4	50.0	8015/8270
53	2,2',3,3',4,4',5,5',6,6'-Decabromodiphenyl ether	1163-19-5	10.0	8270
54	Perfluorooctanyl sulphonic acid and its salts; PFOS	1763-23-1	1.0	EPA PFOA
55	4-octyl phenol	1806-26-4	10.0	USGS 5-B2
56	2-Ethyl-hexyl-4-methoxycinnamate	5466-77-3	5.0	HPLC
57	Mercury & mercury compounds	7439-97-6	0.5	EPA ³
58	Molybdenum & molybdenum compounds	7439-98-7	1.0	EPA ³
59	Antimony & Antimony compounds	7440-36-0	1.0	EPA ³
60	Arsenic & Arsenic compounds	7440-38-2	1.0	EPA ³
61	Cadmium & cadmium compounds	7440-43-9	1.0	EPA ³
62	Cobalt & Cobalt compounds	7440-48-4	1.0	EPA ³
63	Butylated hydroxyanisole	25013-16-5	10.0	USGS 5-B2
64	Hexabromocyclododecane	25637-99-4	10.0	3540/GCMS
65	DIDP; Diisodecyl Phthalate	26761-40-0	50.0	8270
66	DiNP (Di-iso-nonyl phthalate)	28553-12-0	50.0	8270

If you would like Ecology to review a method that is not listed here, you must provide Ecology with a copy of the method for review.

² LC/MS = liquid chromatography/mass spectroscopy. Ecology found this method was used for some applications but may not be applicable to all product matrices.

³ EPA = SW-846 general method 6020 or appropriate SW-846 7000 metal specific analysis, <http://www.epa.gov/epawaste/hazard/testmethods/sw846/online/index.htm>

Chemicals:

1. Formaldehyde

Formaldehyde is used as a solvent in the manufacture of polymers and as an intermediate in the production of other compounds. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8315, carbonyl organic compounds like formaldehyde can be analyzed in '*... aqueous, soil and waste samples...*' For the purposes of the Children's Safe Product Act, products containing formaldehyde are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for formaldehyde in a wide range of media.

2. Aniline

Aniline is used as a solvent, in the manufacture of polymers and as an intermediate in the production of other compounds. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8270, semi-volatile organic compounds like aniline can be analyzed in '*... many types of solid waste matrices, soils, air sampling media and water samples.*' For the purposes of the Children's Safe Product Act, products containing aniline are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for aniline in a wide range of media..

3. N-Nitrosodimethylamine

N-Nitrosodimethylamine is used as a solvent. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8270, semi-volatile organic compounds like N-nitrosodimethylamine can be analyzed in '*... many types of solid waste matrices, soils, air sampling media and water samples.*' For the purposes of the Children's Safe Product Act, products containing N-nitrosodimethylamine are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for N-nitrosodimethylamine in a wide range of media.

4. n-Butanol

n-Butanol is typically used as a solvent and chemical intermediate in numerous applications and can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8260, volatile organic compounds like n-butanol can be analyzed in '*... nearly all types of samples ... including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oil wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments.*' For the purposes of the Children's Safe Product Act, products containing n-butanol are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for n-butanol in a wide range of media.

5. Benzene

Benzene is typically used as a raw material in a wide range of chemical industries including plastics manufacture and as a general solvent. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8260, volatile organic compounds like benzene can be analyzed in '*... nearly all types of samples ... including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oil wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments.*' For the purposes of the Children's Safe Product Act, products containing benzene are unlikely to pose an analysis problem. Ecology has analyzed complex environment matrices such as sludges for benzene.

6. Vinyl chloride

Vinyl chloride is used in the plastics industry for the formation of polyvinyl chloride although it does have other, minor uses such as an intermediate for other chlorinated compounds. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8260, volatile organic compounds like vinyl chloride can be analyzed in '*... nearly all types of samples ... including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oil wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments.*' For the purposes of the Children's Safe Product Act, products containing vinyl chloride are unlikely to pose an analysis problem. Ecology has analyzed complex environment matrices such as sludges for vinyl chloride.

7. Acetaldehyde

Acetaldehyde is used as a flavoring agent in foods, a chemical intermediate for a wide range of compounds such as disinfectants, drugs, dyes, explosives, lacquers, etc. and a monomer in polymers such as polyacetaldehyde. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8315, volatile organic compounds like acetaldehyde can be analyzed in '*... aqueous, soil and waste samples....*' For the purposes of the Children's Safe Product Act, products containing acetaldehyde are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for acetaldehyde in a wide range of media.

8. Methylene chloride

Methylene chloride is used as a solvent and as a chemical intermediate for other chlorinated compounds. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8260,

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volatile organic compounds like methylene chloride can be analyzed in '*... nearly all types of samples ... including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oil wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments.*' Methylene chloride is used extensively in the laboratory to clean and dry laboratory glassware, often causing contamination of the sample. Therefore, a higher detection limit is likely compared with the MDLs reported in the methodology. For the purposes of the Children's Safe Product Act, products containing methylene chloride are unlikely to pose an analysis problem. Ecology has analyzed complex environment matrices such as sludges for methylene.

9. Carbon disulfide

Carbon disulfide is used as a solvent and as a chemical intermediate for other compounds. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8260, volatile organic compounds like carbon disulfide can be analyzed in '*... nearly all types of samples ... including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oil wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments.*' For the purposes of the Children's Safe Product Act, products containing carbon disulfide are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for carbon disulfide in a wide range of media.

10. Methyl ethyl ketone

Methyl ethyl ketone (2-Butanone) is used as a solvent and in the processing of food. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8260, volatile organic compounds like methyl ethyl ketone can be analyzed in '*... nearly all types of samples ... including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oil wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments.*' For the purposes of the Children's Safe Product Act, products containing methyl ethyl ketone are unlikely to pose an analysis problem. Ecology has analyzed complex environment matrices such as sludges for methyl ethyl ketone. .

11. 1,1,2,2-Tetrachloroethane

1,1,2,2-Tetrachloroethane is used as a solvent and in the manufacture of other chlorinated compounds. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8260, volatile organic compounds like 1,1,2,2-tetrachloroethane can be analyzed in '*... nearly all types of samples ... including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oil wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments.*' For the purposes of the Children's Safe Product Act, products

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containing 1,1,2,2-tetrachloroethane are unlikely to pose an analysis problem. Ecology has analyzed complex environment matrices such as sludges for 1,1,2,2-tetrachloroethane.

12. Tetrabromobisphenol A

Tetrabromobisphenol A (TBBPA) is used as a flame retardant with its greatest use being in the plastics industry. It can be analyzed in a wide range of media using methodologies. Methods have been developed in the European Union due to the emphasis placed upon brominated flame retardants with the passage of legislation such as RoHS, WEEE and REACH. Methods have been used in Europe using XRF analyses as a screen for the presence of bromine. Further analysis either by FTIR or standard GC/MS methodologies have been developed for testing many different media such as milk, plastics, etc. For the purposes of the Children's Safe Product Act, products containing TBBPA are unlikely to pose an analysis problem. Laboratories were identified that were able to analyze products for TBBPA using EPA prep method 3540 with subsequent GC/MS analysis with a reporting limit of 20 ppm.

13. Bisphenol A

Bisphenol A (BPA) is used in the manufacture of plastics and as an intermediate in the manufacture of other chemical compounds. Standard methods have been developed for the analysis of various media and Ecology has already analyzed some children's products for BPA. For the purposes of the Children's Safe Product Act, products containing BPA are unlikely to pose an analysis problem.

14. Diethyl phthalate

Diethyl phthalate is used as an additive to soften plastics and as a solvent. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8061, organic compounds like diethyl phthalate can be analyzed in '*... aqueous and solid waste matrices including groundwater, leachate, soil, sludge and sediment.*' For the purposes of the Children's Safe Product Act, products containing diethyl phthalate are unlikely to pose an analysis problem. Ecology has already analyzed some children's products for diethyl phthalate.

15. Dibutyl phthalate

Dibutyl phthalate is used as an additive to soften plastics and as a solvent. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8061, organic compounds like dibutyl phthalate can be analyzed in '*... aqueous and solid waste matrices including groundwater, leachate, soil, sludge and sediment.*' For the purposes of the Children's Safe Product Act, products containing dibutyl

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phthalate are unlikely to pose an analysis problem. Ecology has already analyzed some children's products for dibutyl phthalate.

16. Di-n-hexyl phthalate

Di-n-hexyl phthalate is used as an additive to soften plastics and as a solvent. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8061, organic compounds like di-n-hexyl phthalate can be analyzed in '*... aqueous and solid waste matrices including groundwater, leachate, soil, sludge and sediment.*' For the purposes of the Children's Safe Product Act, products containing di-n-hexyl phthalate are unlikely to pose an analysis problem. Ecology has already analyzed some children's products for di-n-hexyl phthalate.

17. Phthalic anhydride

Phthalic anhydride is used as an additive to soften plastics. Phthalic anhydride is difficult to analyze as it rapidly hydrolyzes in water. As stated in the National Library of Medicine's Hazardous Substances Database (HSDB):

'...when in contact with water [phthalic anhydride], rapidly hydrolyzes. Therefore, in moist or wet environments, the hydrolysis product will predominate and not the anhydride. Most studies designed to assess health or ecological effects of the anhydride may also be measuring the effects of the hydrolysis product. This is because the anhydride may rapidly hydrolyze in food and water, on moist surfaces such as skin and lungs, or in body fluids and tissues. Given this behavior, many of the entries in this record may be providing information on the health effects and environmental impacts of the hydrolysis product rather than the title compound. ...'

Phthalic anhydride can be analyzed in SW-846 method 8270, organic compounds like phthalic anhydride can be analyzed in '*... aqueous and solid waste matrices including groundwater, leachate, soil, sludge and sediment.*' Recovery, however, for the prep methods tested, is an issue and 8270 may not be a viable method. Many of the hydrolysis products from the reaction of phthalic anhydride and water can be analyzed by EPA SW-846 Method 8091. Method 8091 can be used on a wide range of media including water, soil and waste.

For the purposes of the Children's Safe Product Act, products containing phthalic anhydride are unlikely to pose an analysis problem if analysis of the degradation products is assumed to be a viable alternative to direct measurement.

18. Benzyl butyl phthalate

Benzyl butyl phthalate is used as an additive to soften plastics and as a solvent. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8061, organic compounds like benzyl butyl phthalate can be analyzed in '*... aqueous and solid waste matrices including groundwater,*

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leachate, soil, sludge and sediment. For the purposes of the Children's Safe Product Act, products containing benzyl butyl phthalate are unlikely to pose an analysis problem. Ecology has already analyzed some children's products for benzyl butyl phthalate.

19. N-Nitrosodiphenylamine

N-Nitrosodiphenylamine is used in the manufacture of plastics. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8270, semi-volatile organic compounds like N-nitrosodiphenylamine can be analyzed in '*... many types of solid waste matrices, soils, air sampling media and water samples.*' For the purposes of the Children's Safe Product Act, products containing N-nitrosodiphenylamine are unlikely to pose an analysis problem.

20. Hexachlorobutadiene

Hexachlorobutadiene is used in the manufacture of plastics. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8270, semi-volatile organic compounds like hexachlorobutadiene can be analyzed in '*... many types of solid waste matrices, soils, air sampling media and water samples.*' For the purposes of the Children's Safe Product Act, products containing hexachlorobutadiene are unlikely to pose an analysis problem. Ecology has analyzed complex environment matrices such as sludges for hexachlorobutadiene.

21. Propyl paraben

Propyl paraben is used as a preservative in food and cosmetics. It can be analyzed in a wide range of media using methodologies validated by the USDA, the CDC and the European Union. The European Union has established an HPLC method for the detection of a range of parabens including propyl paraben in cosmetics. For the purposes of the Children's Safe Product Act, products containing propyl paraben are unlikely to pose an analysis problem.

22. Butyl paraben

Butyl paraben is used as a preservative in food and cosmetics. It can be analyzed in a wide range of media using methodologies validated by the USDA, the CDC and the European Union. The European Union has established an HPLC method for the detection of a range of parabens including butyl paraben in cosmetics. For the purposes of the Children's Safe Product Act, products containing butyl paraben are unlikely to pose an analysis problem.

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23. 2-Aminotoluene

2-Aminotoluene is used in the textile printing industry and as an intermediate in the manufacture of other dyes. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8260, volatile organic compounds like 2-aminotoluene can be analyzed in '*... nearly all types of samples ... including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oil wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments.*' For the purposes of the Children's Safe Product Act, products containing 2-aminotoluene are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for 2-aminotoluene in a wide range of media.

24. 2,4-Diaminotoluene

2,4-Diaminotoluene is used in the manufacture of plastics and as an intermediate in the production of other chemicals. The European Union has placed restrictions on the amount of 2,4-diaminotoluene that can be found in consumer products and several test reports on consumer products were found with method detection limits in the 3-5 ppm range. For the purposes of the Children's Safe Product Act, products containing 2,4-diaminotoluene are unlikely to pose an analysis problem.

25. Methyl paraben

Methyl paraben is used as a preservative in food and cosmetics. It can be analyzed in a wide range of media using methodologies validated by the USDA, the CDC and the European Union. The European Union has established an HPLC method for the detection of a range of parabens including methyl paraben in cosmetics. For the purposes of the Children's Safe Product Act, products containing methyl paraben are unlikely to pose an analysis problem.

26. p-Hydroxybenzoic acid

p-Hydroxybenzoic acid is used as a food preservative, as an intermediate for compounds such as dyes, fungicides and the paraben series of preservatives and in the manufacture of polyester. Analysis of p-hydroxybenzoic acid is required by the European Cosmetic Legislation and both thin layer and high performance liquid chromatography methods have been established for the analysis of p-hydroxybenzoic acid and its derivatives, primarily the methyl-, ethyl-, butyl- and propyl-parabens. The compound p-hydroxybenzoic acid can be determined at the 10 ppm level based upon a study conducted by the Danish Government.

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27. Ethyl benzene

Ethyl benzene is used in the textile printing industry and as an intermediate in the manufacture of other dyes. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8260, volatile organic compounds like ethyl benzene can be analyzed in '*... nearly all types of samples ... including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oil wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments.*' For the purposes of the Children's Safe Product Act, products containing ethyl benzene are unlikely to pose an analysis problem. Ecology has analyzed complex environment matrices such as sludges for ethyl benzene.

28. Styrene

Styrene is used in the manufacture of plastics and as a flavoring agent in food. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8260, volatile organic compounds like styrene can be analyzed in '*... nearly all types of samples ... including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oil wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments.*' For the purposes of the Children's Safe Product Act, products containing styrene are unlikely to pose an analysis problem. Ecology has analyzed complex environment matrices such as sludges for styrene.

29. 4-Nonylphenol

4-Nonylphenol is used as a precursor to a number of surfactants. It can be analyzed in a wide range of media including sand, river sediment and topsoil and validated by the USGS at an initial method detection limit less than 500 ppb. For the purposes of the Children's Safe Product Act, products containing 4-nonylphenol are unlikely to pose an analysis problem.

30. 4-Chloroaniline

4-Chloroaniline is used as an intermediate in the manufacture of other chlorinated chemicals. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8270, semi-volatile organic compounds like 4-chloroaniline can be analyzed in '*... many types of solid waste matrices, soils, air sampling media and water samples.*' For the purposes of the Children's Safe Product Act, products containing 4-chloroaniline are unlikely to pose an analysis problem. Ecology has analyzed complex environment matrices such as sludges for 4-chloroaniline.

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31. Acrylonitrile

Acrylonitrile is used in the manufacture of plastics and as a flavoring agent in food. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8260, volatile organic compounds like acrylonitrile can be analyzed in '*... nearly all types of samples ... including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oil wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments.*' For the purposes of the Children's Safe Product Act, products containing acrylonitrile are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for acrylonitrile in a wide range of media.

32. Ethylene glycol

Ethylene glycol is used as antifreeze in heating and cooling systems and as a solvent. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8260, volatile organic compounds like ethylene glycol can be analyzed in '*... nearly all types of samples ... including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oil wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments.*' For the purposes of the Children's Safe Product Act, products containing ethylene glycol are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for ethylene glycol in a wide range of media.

33. Toluene

Toluene is used as a solvent and as an intermediate for other chemicals. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8260, volatile organic compounds like toluene can be analyzed in '*... nearly all types of samples ... including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oil wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments.*' For the purposes of the Children's Safe Product Act, products containing toluene are unlikely to pose an analysis problem. Ecology has analyzed complex environment matrices such as sludges for toluene.

34. Phenol

Phenol is used as an intermediate in the manufacture of other chlorinated chemicals and as a biocide in certain applications. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8270, semi-volatile organic compounds like phenol can be analyzed in '*... many types of solid waste matrices, soils, air sampling media and water samples.*' For the purposes of the Children's Safe Product

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Act, products containing phenol are unlikely to pose an analysis problem. Ecology has analyzed complex environment matrices such as sludges for phenol.

35. 2-Methoxyethanol

2-Methoxyethanol is used as a solvent in a wide range of applications and consumer products. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8015, semi-volatile organic compounds 2-methoxyethanol can be analyzed in ground or surface waters and soils and solid samples. For the purposes of the Children's Safe Product Act, products containing 2-methoxyethanol are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for 2-methoxyethanol in a wide range of media.

36. Ethylene glycol monoethyl ester

Ethylene glycol monoethyl ester is used as a solvent in a wide range of applications and as a chemical intermediate in the manufacture of the solvent 2-ethoxyethyl acetate. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8015, semi-volatile organic compounds like ethylene glycol monoethyl ester can be analyzed in ground or surface waters and soils and solid samples. For the purposes of the Children's Safe Product Act, products containing ethylene glycol monoethyl ester are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for ethylene glycol monoethyl ester in a wide range of media.

37. Tris (2-chloroethyl) phosphate

Tris (2-chloroethyl) phosphate is used as flame retardant and plasticizer. Several laboratory test reports were found identifying analyses for this compound are being routinely done by laboratories for compliance with European Union regulations. For the purposes of the Children's Safe Product Act, products containing tris (2-chloroethyl) phosphate are unlikely to pose an analysis problem.

38. Bis(2-ethylhexyl) phthalate

Bis(2-ethylhexyl) phthalate is used as an additive to soften plastics and can be found in a wide range of products including imitation leather, rain and footwear, upholstery, and children's toys. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8061, organic compounds like bis(2-ethylhexyl) phthalate can be analyzed in '*... aqueous and solid waste matrices including groundwater, leachate, soil, sludge and sediment.*' For the purposes of the Children's Safe Product Act, products containing bis(2-ethylhexyl) phthalate are unlikely to pose an analysis problem. Ecology has already analyzed some children's products for bis(2-ethylhexyl) phthalate.

39. Di-n-octyl phthalate

Di-n-octyl phthalate is used as an additive to soften plastics, primarily cellulose ester, polystyrene and vinyl resins. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8061, organic compounds like di-n-octyl phthalate can be analyzed in '*... aqueous and solid waste matrices including groundwater, leachate, soil, sludge and sediment.*' For the purposes of the Children's Safe Product Act, products containing di-n-octyl phthalate are unlikely to pose an analysis problem. Ecology has already analyzed some children's products for di-n-octyl phthalate.

40. Hexachlorobenzene

Hexachlorobenzene is used as an intermediate in the manufacture of other chemicals. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8270, semi-volatile organic compounds like hexachlorobenzene can be analyzed in '*... many types of solid waste matrices, soils, air sampling media and water samples.*' For the purposes of the Children's Safe Product Act, products containing hexachlorobenzene are unlikely to pose an analysis problem. Ecology has analyzed complex environment matrices such as sludges for hexachlorobenzene.

41. 3,3'-Dimethylbenzidine

3, 3'-Dimethylbenzidine is used as an intermediate in the manufacture of azo-dyes. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8270, semi-volatile organic compounds like 3, 3'-dimethylbenzidine can be analyzed in '*... many types of solid waste matrices, soils, air sampling media and water samples.*' For the purposes of the Children's Safe Product Act, products containing 3, 3'-dimethylbenzidine are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for 3, 3'-dimethylbenzidine in a wide range of media.

42. Ethyl paraben

Ethyl paraben is used as a preservative in food and cosmetics. It can be analyzed in a wide range of media including urine, food and cosmetics using methods developed by EPA, the European Union and other authoritative organizations. The European Union has established an HPLC method for the detection of a range of parabens including ethyl paraben in cosmetics. For the purposes of the Children's Safe Product Act, products containing ethyl paraben are unlikely to pose an analysis problem.

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43. 1,4-Dioxane

1,4-Dioxane is used as a solvent in a wide range of products include cosmetics, shampoo and bath preparations. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8260, volatile organic compounds like 1,4-dioxane can be analyzed in '*... nearly all types of samples ... including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oil wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments.*' For the purposes of the Children's Safe Product Act, products containing 1,4-dioxane are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for 1,4-dioxane in a wide range of media.

44. Perchloroethylene

Perchloroethylene is used as a solvent in textile applications and in dry cleaning. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8260, volatile organic compounds like perchloroethylene can be analyzed in '*... nearly all types of samples ... including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oil wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments.*' For the purposes of the Children's Safe Product Act, products containing perchloroethylene are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for perchloroethylene in a wide range of media.

45. Benzophenone-2

Benzophenone-2 is used as a UV stabilizer in a wide range of consumer products and analytical work has been done in that media. In order to identify a method for benzophenone-2, Ecology contacted a laboratory that specializes in cosmetic analyses. The laboratory indicated it was possible to detect benzophenone-2 in cosmetic products at the 5 ppm level using GC-FID equipment. For the purposes of the Children's Safe Product Act, products containing benzophenone-2 are unlikely to pose an analysis problem.

46. 4-tert-Octylphenol

4-tert-Octylphenol is used in the manufacture of surfactants. It can be analyzed in a wide range of media including sand, sediment and topsoil and validated by the USGS at an initial method detection limit (MDL) of less than 40 ppb. For the purposes of the Children's Safe Product Act, products containing 4-tert-octylphenol are unlikely to pose an analysis problem.

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47. Estragole

Estragole is used as a synthetic flavoring agent in a wide range of consumer products and as a fragrance in perfume and other applications. It has been analyzed primarily in cosmetic products and the International Fragrance Association has developed a method for its analysis in the range of 10-200 mg/L. For the purposes of the Children's Safe Product Act, products containing estragole is unlikely to pose an analysis problem.

48. 2-Ethylhexanoic acid

2-Ethylhexanoic acid is used as a flavoring agent and as a fragrance in consumer products such as perfumes, soaps and detergents. 2-Ethylhexanoic acid has been identified as potentially causing negative reproductive effects by the German Federal Institute for Occupational Safety and Health and EPA recently announced it may present an unreasonable risk of oncongenicity, developmental toxicity and sub-chronic toxicity. No US method could be identified for the analysis of products; however, a contract laboratory was identified in Europe that advertised the testing of food and packaging products for 2-ethylhexanoic acid at a detection level as low as 50 micrograms/kg (ppb). For the purposes of the children's Safe Product Act, products containing 2-ethylhexanoic acid are unlikely to pose a problem for analysis.

49. Octamethylcyclotetrasiloxane

Octamethylcyclotetrasiloxane is used as an intermediate in the production of other silicone based compounds. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8260, volatile organic compounds like octamethylcyclotetrasiloxane can be analyzed in '*... nearly all types of samples ... including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oil wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments.*' For the purposes of the Children's Safe Product Act, products containing octamethylcyclotetrasiloxane are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for octamethylcyclotetrasiloxane in a wide range of media.

50. Pentachlorobenzene

Pentachlorobenzene is used as a chemical intermediate for pentachloronitrobenzene and, historically, was used in dielectric fluids along with PCBs⁴. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8270, semi-volatile organic compounds like pentachlorobenzene can be analyzed in '*... many types of solid waste matrices, soils, air sampling media and water samples.*' For the purposes of the Children's Safe Product Act, products containing pentachlorobenzene are unlikely to pose an

⁴ Information from Health Canada website: http://www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/psl1-lsp1/pentachlorobenzene/pentachlorobenzene_2-eng.php, accessed 4/20/2010.

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analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for pentachlorobenzene in a wide range of media.

51. C.I. Solvent Yellow 14

C.I. Solvent Yellow 14 (Sudan 1) is used as a dye in hydrocarbon solvents, oils, fats, waxes, shoe & floor polishes, gasoline, soap, colored smokes, cellulose ether varnishes and styrene resins. A method was found for the analysis of Sudan 1 in food items, primarily spices, with a detection limit of 10 micrograms/kg. For the purposes of the Children's Safe Product Act, products containing C.I. Solvent Yellow 14 are unlikely to pose an analysis problem.

52. N-Methylpyrrolidone

N-Methylpyrrolidone is used as a solvent in the plastics, pharmaceutical and food industries. It can be analyzed in a wide range of media using methodologies validated by EPA. For the purposes of the Children's Safe Product Act, products containing N-methylpyrrolidone are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for N-methylpyrrolidone in a wide range of media.

53. Decabromodiphenyl ether

Decabromodiphenyl ether is used as flame retardant in the plastics industry. It has historically been widely used in TV housings and other electronics. It can be analyzed in a wide range of media using methodologies validated by EPA. For the purposes of the Children's Safe Product Act, products containing decabromodiphenyl ether are unlikely to pose an analysis problem. Ecology has already conducted analyses of some children's products for decabromodiphenyl ether at the 1 ppm level or lower.

54. Perfluorooctane sulfonic acid

Perfluorooctane sulfonic acid is used as flame a surfactant in fire fighting foam, alkaline cleaners, etc. and as a chemical intermediate. It can be analyzed in a wide range of media using methodologies validated by EPA. For the purposes of the Children's Safe Product Act, products containing perfluorooctane sulfonic acid are unlikely to pose an analysis problem. Ecology was able to find a contract laboratory that advertised the ability to test for perfluorooctane sulfonic acid in a wide range of media.

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55. 4-Octylphenol

4-Octylphenol is used in the manufacture of surfactants, plasticizers and other chemicals. It can be analyzed in a wide range of media validated by the USGS at an initial method detection limit less than 40 ppb. For the purposes of the Children's Safe Product Act, products containing 4-octylphenol are unlikely to pose an analysis problem.

56. 2-Ethyl-hexyl-4-methoxycinnamate

2-Ethyl-hexyl-4-methoxycinnamate is used in the manufacture of surfactants, plasticizers and other chemicals. In Europe, it has been analyzed in consumer products like sunscreens using an HPLC/UV method with a method detection limit of less than 1 ppm. For the purposes of the Children's Safe Product Act, products containing 2-ethyl-hexyl-4-methoxycinnamate are unlikely to pose an analysis problem.

57. Mercury

Total mercury is used as a component in some batteries, in dental amalgams, in switching devices and as a fumigant to protect grain from insect infestation. It can be determined in a wide range of media including groundwater and aqueous and solid matrices using methodologies validated by EPA. For the purposes of the Children's Safe Product Act, products containing mercury are unlikely to pose an analysis problem. Ecology has already analyzed some children's products for mercury and has obtained detection limits in the ppb range.

58. Molybdenum

Molybdenum is used in specialized alloys, as a catalyst and as a pigment in paints, lacquers, ink, rubber and leather goods. It can be determined in a wide range of media including groundwater and aqueous and solid matrices using methodologies validated by EPA. For the purposes of the Children's Safe Product Act, products containing molybdenum are unlikely to pose an analysis problem. Ecology has already analyzed some children's products for molybdenum and has obtained detection limits in the ppb range.

59. Antimony

Antimony is used in specialized alloys, semiconductors, lead acid batteries and flame retardants for plastics, paints, textiles and rubber. It can be determined in a wide range of media including groundwater and aqueous and solid matrices using methodologies validated by EPA. For the purposes of the Children's Safe Product Act, products containing antimony are unlikely to pose an analysis problem. Ecology has already analyzed some children's products for antimony and has obtained detection limits in the ppb range.

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60. Arsenic

Arsenic is used as a biocide, catalyst, wood preservative, a radioactive tracer and in specialized alloys in electronics. It can be determined in a wide range of media including groundwater and aqueous and solid matrices using methodologies validated by EPA. For the purposes of the Children's Safe Product Act, products containing arsenic are unlikely to pose an analysis problem. Ecology has already analyzed some children's products for arsenic and has obtained detection limits in the ppb range.

61. Cadmium

Cadmium is used in batteries (Ni-Cd), coating and electroplating of steel and cast iron, pigments, alloys, etc. It can be determined in a wide range of media including groundwater and aqueous and solid matrices using methodologies validated by EPA. For the purposes of the Children's Safe Product Act, products containing cadmium are unlikely to pose an analysis problem. Ecology has already analyzed some children's products for cadmium and has obtained detection limits in the ppb range.

62. Cobalt

Cobalt is used as a catalyst and in specialized alloys. It can be determined in a wide range of media including groundwater and aqueous and solid matrices using methodologies validated by EPA. For the purposes of the Children's Safe Product Act, products containing total cobalt are unlikely to pose an analysis problem. Ecology has already analyzed some children's products for cobalt and has obtained detection limits in the ppb range.

63. Butylated hydroxyanisole

Butylated hydroxyanisole (BHA) is used as an antioxidant and general preservative, primarily in cosmetics. It can be analyzed in a wide range of media including sand, sediment and topsoil and validated by the USGS at an initial method detection limit (MDL) of less than 110 ppb. For the purposes of the Children's Safe Product Act, products containing BHA are unlikely to pose an analysis problem.

64. Hexabromocyclododecane

Hexabromocyclododecane is used as a flame retardant in a wide range of products including upholstered furniture, draperies, beds, textiles, automobiles, etc. The European Union has placed restrictions on the amount of hexabromocyclododecane that can be found in consumer products and several test reports on consumer products were found with method detection limits in the 10 ppm range. For the purposes of the Children's Safe Product Act, products containing hexabromocyclododecane are unlikely to pose an analysis problem.

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65. Diisodecyl phthalate

Diisodecyl phthalate is used as an additive to soften plastics and is the preferred plasticizer for PVC in wire and cable applications. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8061, organic compounds like diisodecyl phthalate can be analyzed in '*... aqueous and solid waste matrices including groundwater, leachate, soil, sludge and sediment.*' For the purposes of the Children's Safe Product Act, products containing diisodecyl phthalate are unlikely to pose an analysis problem. Ecology has already analyzed some children's products for diisodecyl phthalate.

66. Di-iso-nonyl phthalate

Di-iso-nonyl phthalate is used as an additive to soften plastics and a majority (approximately 95%) of di-iso-nonyl phthalate is used in polyvinyl chloride plastic applications. It can be analyzed in a wide range of media using methodologies validated by EPA. As stated in SW-846 method 8061, organic compounds like di-iso-nonyl phthalate can be analyzed in '*... aqueous and solid waste matrices including groundwater, leachate, soil, sludge and sediment.*' For the purposes of the Children's Safe Product Act, products containing di-iso-nonyl phthalate are unlikely to pose an analysis problem. Ecology has already analyzed some children's products for di-iso-nonyl phthalate.